UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,483	02/26/2004	Akira Kikuchi	07403.0004-00	7014

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EXAMINER
GUADALUPE, YARITZA

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	**Application No.** 10/787,483	**Applicant(s)** KIKUCHI ET AL.	
	Examiner Yaritza Guadalupe McCall	**Art Unit** 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.
2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-25_ is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _1-25_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on _26 February 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☒ All   b)☐ Some * c)☐ None of:
        1.☒ Certified copies of the priority documents have been received.
        2.☐ Certified copies of the priority documents have been received in Application No. _____.
        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _2/26/2004_.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1 - 25 are rejected under 35 U.S.C. 102 (b) as being anticipated by Raab (US

6,606,539).

With respect to claim 1, Raab discloses a multi-joint coordinate measuring system

comprising a support member (22), a multi-joint measuring arm (10) having a first end (56)

for installation of a probe (See Column 6, line 11) and a second end (14) for attachment to the

support member (See Figure 3), the arm including a head member (54, 56) for holding the

probe, a first link (50); a second link (44); a wrist joint (57, 58) for providing a bending

motion between the head member and the first link; an elbow joint (46) for providing a bending

motion between the first link and the second link; and a shoulder joint (60) for providing a

bending motion between the second link and the support member, a processor (16, 18)

configured to produce a three-dimensional coordinate corresponding to a position of the probe

based on an angle of each joint of the measuring arm (See Column 5, lines 41 – 45); and a

warning indicator (20) that warns a user in response to a detection of at least one of first and

second conditions (See Column 5, lines 35 - 45), the first condition being that an angle between

the first and second links exceeds a first value and the second condition being that a distance

from a supporting point of the measuring arm to a head point of the measuring arm exceeds a

second value (See Column 9, lines 1 – 8).

In regards to claims 2 - 5, Raab also discloses a system wherein the processor is further

operative to detect the first condition based on an angle of the elbow joint, to detect the second

condition using, as the supporting point of the measuring arm, a point determined based on at

least one of a position of the shoulder joint, a support member position of the second end, and a

position of the support member (See Column 9, lines 17 - 40).

Regarding to claims 6 and 7, Raab teaches a system further comprising a counter balance

(60), provided in association with the shoulder joint, for generating a force raising the second

link on a side of the elbow joint against gravity, and wherein the warning indicator warns a user

in response to a detection of at least one of the first and second conditions and a third condition,

the third condition being that the shoulder joint provides the second link with a bending motion

beyond a range determined based on the force generated by the counter balance, and wherein the

processor uses, to produce the three-dimensional coordinate, a formula including a term for

correcting an error due to a change of the force generated by the counter balance, the force

varying depending on an angle of the shoulder joint (See Column 9, lines 1 – 8).

In regards to claim 8, Raab also discloses a system wherein the processor is controlled

not to output the three-dimensional coordinate after the detection (See Column 3, lines 1 – 16

and 35 – 52).

Regarding claim 9, Raab shows a system wherein the measuring arm further includes a

first joint (57, 58) for providing a twisting motion between the head member (56) and the first

link (50); a second joint (46) for providing a twisting motion between the first link (50) and

the second link (44); and a third joint (60) for providing a twisting motion between the second

link (44) and the support member (22).

In regards to claim 10, Raab discloses a multi-joint coordinate measuring system

comprising a support member (22), a multi-joint measuring arm (10) having a first end (56)

for installation of a probe and a second end (14) for attachment to the support member (22),

the arm including a head member (54, 56) for holding the probe; a first link (50); a second link

(44); a wrist joint (57, 58) for providing a bending motion between the head member and the

first link (50); an elbow joint (46) for providing a bending motion between the first link and

the second link (44); and a shoulder joint (60.) for providing a bending motion between the

second link (44) and the support member (22); a processor (16, 18) configured to produce a

three-dimensional coordinate corresponding to a position of the probe based on an angle of the

measuring arm (See Column 5, lines 41 – 45); a counter balance (60), provided in association

with the shoulder joint, for generating a force raising the second link on a side of the elbow joint

against gravity, and a warning indicator (20) that warns a user in response to a detection of a

condition that the shoulder joint provides the second link with a bending motion beyond a range

determined based on the force generated by the counter balance.

With respect to claim 11, Raab teaches a system wherein the processor (16, 18) is

controlled not to output the three-dimensional coordinate after the detection (See Column 3,

lines 1 – 16 and 35 – 52).

Regarding claim 12, Raab further teaches a system wherein the measuring arm further

includes a first joint (57, 58) for providing a twisting motion between the head member (56)

and the first link (50); a second joint (46) for providing a twisting motion between the first

link (50) and the second link (44); and a third joint (60) for providing a twisting motion

between the second link (44) and the support member (22).

In regards to the method step of claim 13, the system disclosed by Raab could perform

the method of controlling measurement by a multi-joint coordinate measuring system, the system

including a support member (22), a multi-joint measuring arm (10) having a first end attached

to the support member (22) and a second end, a probe installed at the second end of the

measuring arm, and a processor (16, 18) capable of producing a three-dimensional coordinate

corresponding to a position of the probe based on an angle of each joint of the measuring arm

(See Column 5, lines 41 – 45), the method comprising the steps of detecting a parameter

concerning a posture of the measuring arm exceeding a prescribed value, the prescribed value

having been determined in accordance with a first probability that a measurement error due to a

user action pulling the measuring arm away from the support member becomes out of an

allowable range, and warning a user in accordance with a result of the detecting.

Regarding claim 14, Raab's system teaches a system wherein a first parameter concerning

an angle between links of the measuring arm and a second parameter concerning a distance of

the measuring arm's reach are used in the detecting, and the warning is performed when at least

one of the first and second parameters exceeds a corresponding prescribed value.

With respect to claim 15, Raab also shows a system further capable of controlling the

processor not to output the three-dimensional coordinate in accordance with a result of the

detecting step.

Regarding claim 16, Raab discloses a system which will allow for additionally detecting

the parameter concerning the posture of the measuring arm exceeding a limit value, the limit

value corresponding to a second probability concerning the measurement error larger than the

first probability, and controlling the processor not to output the three-dimensional coordinate in

accordance with a result of the additional detecting.

With respect to claim 17, Raab discloses a multi-joint measuring system including a

support member (22), a multi-joint measuring arm (10) having a first end attached to the

support member and a second end, said system including a probe a probe installed at the second

end (54, 56) of the measuring arm, a processor (16, 18) capable of producing a three-

dimensional coordinate corresponding to a position of the probe based on an angle of each joint

of the measuring arm (See Column 5, lines 41 – 45), and a counter balance (60) configured to

generate a force raising the measuring arm against gravity, the system allowing the steps of

detecting a parameter concerning a posture of the measuring arm exceeding a prescribed value,

the prescribed value having been determined in accordance with a first probability that a

measurement error due to a user action moving the measuring arm with a change in the force

applied to the measuring arm by the counter balance becomes out of an allowable range; and

warning a user in accordance with a result of the detecting (See Column 9, lines 1 – 8).

Regarding to claim 18, Raab teaches system further capable of controlling the processor

not to output the three-dimensional coordinate in accordance with a result of the detecting (See

Column 3, lines 1 – 16 and 35 – 52).

In regards to claim 19, Raab discloses a system which will allow for additionally

detecting the parameter concerning the posture of the measuring arm exceeding a limit value, the

limit value corresponding to a second probability concerning the measurement error larger than

the first probability, and controlling the processor not to output the three-dimensional coordinate

in accordance with a result of the additional detecting.

With regards to claim 20, Raab teaches a multi-joint coordinate measuring system

comprising a support member (22), a multi-joint measuring arm (10) having a first end (56)

for installation of a probe and a second end (14) for attachment to the support member (22),

the arm including a head member (54, 56) for holding the probe; a first link (50) ; a second

link (44); a wrist joint (57, 58) for providing a bending motion between the head member (56)

and the first link (50); an elbow joint (46) for providing a bending motion between the first

link (50) and the second link (44); and a shoulder joint (60) for providing a bending motion

between the second link (44) and the support member (22), a counter balance (60), provided

in association with the shoulder joint, for generating a force raising the second link on a side of

the elbow joint against gravity, and a processor (16, 18) configured to input an angle of each

joint of the measuring arm into a formula to produce a three-dimensional coordinate

corresponding to a position of the probe, the formula including a term for correcting an error due

to a change of the force generated by the counter balance.

Regarding claim 21, Raab also teaches a system wherein the formula includes, in

association with the term, a parameter representing a deflection of the second link due to the

force generated by the counter balance, the parameter being determined based on an angle of the

shoulder joint.

In regards to claim 22, Raab further discloses a system wherein the measuring arm

further includes a first joint (57 , 58) for providing a twisting motion between the head member

(54, 56) and the first link (50); a second joint (46) for providing a twisting motion between

the first link (50) and the second link (44); and a third joint (60) for providing a twisting

motion between the second link (44) and the support member (22).

With respect to claim 23, the system shown by Raab including a three-dimensional coordinate by a multi-joint coordinate measuring system, the system including a support member (22), a multi-joint measuring arm (10) having a first end attached to the support member (22) and a second end, a probe installed at the second end of the measuring arm, and a counter balance (60) configured to generate a force raising the measuring arm against gravity, could allow to perform the method comprising the step of inputting a plurality of joint angle data from the measuring arm; calculating from the input data a three-dimensional coordinate corresponding to a position of the probe, by a formula including a term for correcting an error due to a change of the force generated by the counter balance, and outputting the three-dimensional coordinate.

With respect to claim 24, Raab discloses a multi-joint coordinate measuring system comprising a support member (22), a multi-joint measuring arm (10) having a first end attached to the support member, a second end (54, 56) at which a probe can be installed, and a plurality of joints (57, 58, 46, 60), a processor (16, 18) configured to produce a three-dimensional coordinate corresponding to a position of the probe based on an angle of each joint of the measuring arm, and to detect a parameter concerning a posture of the measuring arm exceeding a prescribed value, the prescribed value having been determined in accordance with a probability that a measurement error due to a user action pulling the measuring arm away from the support member becomes out of an allowable range; and a warning indicator (20) configured to warn a user in accordance with a result of the detection by the processor.

Regarding to claim 25, Raab teaches a multi-joint coordinate measuring system

comprising a support member (22), a multi-joint measuring arm (10) having a first end

attached to the support member (22), a second end (54, 56) at which a probe can be installed,

and a plurality of joints (57, 58, 46, 60), a counter balance (60) configured to generate a force

raising the measuring arm against gravity, a processor (16, 18) configured to produce a three-

dimensional coordinate corresponding to a position of the probe based on an angle of each joint

of the measuring arm, and to detect a parameter concerning a posture of the measuring arm

exceeding a prescribed value, the prescribed value having been determined in accordance with a

probability that a measurement error due to a user action moving the measuring arm with a

change in the force applied to the measuring arm by the counter balance becomes out of an

allowable range; and a warning indicator (20) configured to warn a user in accordance with a

result of the detection by the processor.

Conclusion

3.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure. The following reference are considered of relevance to the present application :

   a.   Eaton (US 6,817,108)

   b.   Sawdon (US 6,640,458)

   c.   Granger (US Pub. No. 2003/0177653)

      d.   Bieg et al. (US 6,519,860)

      e.   Raab et al. (US Pub. No. 2004/0111908)

      f.   Watanabe et al. (US 6,763,284)

      g.   Raab et al. (US 6,253,458)

      h.   Patriso et al. (US 5,930,908)

      i.   Raab et al. (US 6,612,044)

      j.   Catala García et al. (US Pub.No. 2004/0016309)

      k.   Piko et al. (US 6,249,985)

      l.   Raab et al. (US Pub. No. 2004/0006882)

      m.   Raab (US 5,794,356)

      n.   Raab (US 5,412,880)

4.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yaritza Guadalupe whose telephone number is (571)272 -2244. The examiner can normally be reached on 9:00 AM - 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F.F. Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YGM
March 18, 2005

Yaritza Guadalupe-McCall
Patent Examiner
Art Unit 2859